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Palmer's Vision

Vision Science: Photons to Phenomenology

By Stephen E. Palmer. Cambridge, MA: MIT Press, 1999. xxii + 810 pp. Cloth, \$70.

Stephen Palmer has given us an exceptional book, *Vision Science: Photons to Phenomenology*. It is unlike anything we have had for a long time, a complete compendium of a unifying science written by a single author whose work is highly respected in that field. Moreover, it may be the last time any single person can perform this task in vision. This science is moving too fast; too few people would want to spend a decade or more trying to amalgamate all its loose ends, as Palmer has done.

Recent compendia in cognitive neuroscience are serviceable for researchers and students in the field, but Palmer's book was needed. The relationship between cognitive neuroscience and vision has been an odd one. Gazzaniga's (1995) *The Cognitive Neurosciences* includes much work on neurophysiology and attention but very little work on the computational study of vision; the second volume of the Invitation to Cognitive Science Series by Osherson, Kosslyn, and Hollerbach (1990), *Visual Cognition and Action*, includes computational vision but no neurophysiology and visual attention; Posner's (1990) *Foundations of Cognitive Science* finds places for computational vision and visual attention but not for neurophysiology; and Spillman and Werner's (1990) *Visual Perception: The Neurophysiological Foundations* focuses on neurophysiology, with some work on attention, but has little to offer on computational vision. Most importantly, none of these four fine works discusses the century's worth of empirical work within psychology on visual perception.

Palmer's achievement invites longer-term comparisons, although there is no direct parallel. It will not occupy a place like that of James's (1890) *Principles of Psychology*, which summarized all of psychology from a coherent point of view, the first and best of many such English-language attempts. Palmer writes well, but James easily rivaled his brother and was an essayist of a cali-

ber we probably will not see again. It is also not like Stevens's (1951) *Handbook of Experimental Psychology*. Although Stevens's original handbook rivals the length of Palmer's tome, has a similar breadth, and has a stylistic coherence, it is multiauthored, and its chapters differ in their penetration and acumen. Palmer's book is doggedly and deliciously uniform. It is not like Marr's (1981) *Vision* because Palmer does not have the force and withering precision of a single-minded perspective on the field, but his new book also offers many more things than Marr ever promised. It is also not like Neisser's (1967) *Cognitive Psychology* because it does not define a field into existence with brevity and clarity; it delimits a very old one across traditional disciplines with trenchant detail. And it is not like Koffka's (1935) *Principles of Gestalt Psychology*, with its crystalline brilliance presenting a new look at perception and allied fields. Although close to Koffka's in some of its themes, Palmer's book has a depth and breadth of presentation that necessarily takes it in a different direction. Perhaps the closest to Palmer's work is Woodworth's (1938) *Experimental Psychology*, a well-written but not overly attractive tome that tried to cover all the relevant empirical material at the time on the study of the human mind. Woodworth's work is about the same length as Palmer's, but its focus and domain of inquiry are different. Palmer promises and delivers an overview of the entire field of vision from perspectives of psychology, neurophysiology, computer science, and a bit of history of science. Only a dash of philosophy is missing.

Palmer also seems to have a unique mission. At the end of the century, few if any long-term vision researchers have been omitted from mention and integration into his argument. This is flattering to everyone and displays the diversity of the field, warts and all. This coverage does not necessarily make the best overview, but it is a thorough one presented from a single perspective. Palmer's own research is featured—particularly his elaborations of Gestalt laws; his explorations of stimulus structure through hierarchies, categories, and points of view; and his contributions to our understanding of the concept of representation—as well as that of his late-found mentor, Irvin Rock.¹ But how could this not have been so? It is a great gift to our discipline.

Vision Science tries to be at least two things and nearly succeeds. It is first a textbook, although several colleagues who have used it as such have found that, even following Palmer's plan of weeding out chapters (pp. xx–xxi), it wears students down with relentless detail. It is twice the length of other recent vision (Buser & Imbert, 1992) and visual perception (Bruce, Green, & Georgeson, 1996; Wade & Swanston, 1991) textbooks. It is better used as a handbook. It should be in all libraries and on most office bookshelves and should be available to all students and researchers of vision. Moreover, Palmer's book is the best example I have seen of the mutual benefits of teaching and research. Each chapter is an outgrowth of outstanding teaching—the teaching and reteaching of the same material for years, updating and honing arguments and presentations until the rhetoric is as convincing as it can be. Good teaching demands mastery of material beyond merely knowing it. Excellence in teaching the same subject many times demands a smoothing and linearization of argu-

ment, incorporating nuance and expanding on it until it not only is one's own but expresses coherent thought, a unification within a discipline.²

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Notes

1. If we take index page citations as a measure of the importance of a given author, then Irvin Rock's work is roughly equal to the combined totals of Julian Hochberg, Roger Shepard, George Sperling, Anne Treisman, and Hans Wallach.

2. Palmer also seems dedicated to perfecting his presentation. For those interested in his ongoing collection of corrections, the appropriate Web site is <http://www.socrates.berkeley.edu/~plab/corrections.html>.

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From Antiquity to the Reagan Era The Unmasking of the Brain: A Retrospective

Brain, Vision, Memory: Tales in the History of Neuroscience

By Charles G. Gross. Cambridge: Massachusetts Institute of Technology Press, 1998. 247 pp. Cloth, \$32.50.

Brain, Vision, Memory is a great read, uncovering a plethora of obscure facts that illustrate the irregular course neuroscientific research has taken from antiquity to the present. This book focuses on many historical anecdotes that, collectively, portray a winding but interesting path in the history of neuroscience.